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TREASURY DEPARTMENT
Public Health and Marine-Hospital Service of the United States

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THE PREVALENCE OF RABIES IN THE UNITED STATES

BY

JOHN W. KERR
Assistant Surgeon-General

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ARTHUR M. STIMSON
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THE PREVALENCE OF RABIES IN THE UNITED STATES.

By Asst. Surg. Gen. John W. Kerr and Passed Asst. Surg. A. M. Stimson.

The identity of rabies as a definite disease appears now to be generally accepted, although there is still some question as to its etiology. The impression has prevailed, however, that the prevalence of the disease both among man and animals was exaggerated and that press reports of rabies among animals were in most instances erroneous.

With the view to determining the prevalence of rabies, or rather its geographical distribution in the United States, a circular letter [a] was sent by the bureau to health officers and others throughout the country having knowledge of the disease. The replies were abstracted by direction of the Surgeon-General and form the basis of this report.

That rabies has been endemic in the United States for more than a hundred years is shown by reports of cases and references to the disease in the medical literature from time to time during that period.

In reviewing the history of rabies in America, Ravenel states that the first outbreak was reported from Boston in 1768; that it appeared in Philadelphia in 1779; that it was prevalent throughout the Northern States in 1785, and that soon after that time it spread to the southern part of the country.[b]

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[a] Washington, *December 31, 1908.*

Dear Doctor: Investigations of rabies are being made by the United States Public Health and Marine-Hospital Service, and it is desired to determine the prevalence of this disease in the United States. This can only be done with the cooperation of every health official and physician throughout the country.

Will you please furnish the data called for on the inclosed blank with respect to cases which have occurred in your community during the calendar year ended December 31, 1908? Should no cases have occurred in your jurisdiction, notification of that fact and return of the blank is nevertheless requested.

The bureau will very much appreciate your assistance in this matter, and the data collected will be of value looking to the prevention of the disease.

Thanking you in advance for your cooperation, I remain,

Respectfully,

Walter Wyman, *Surgeon-General.*

[b] Ravenel, Mazyck P. Bull. 79, Dept. of Agric. of Penna., 1901.

Reports of the disease have also appeared in newspapers from time to time for over a century; one of these published in 1798 and recently quoted by Peters, indicates that the disease prevailed in Massachusetts at that time.[a]

There has undoubtedly been considerable variation in the prevalence of rabies from decade to decade, which fact has been responsible for inquiries in the past regarding the disease. Outbreaks in Massachusetts and other places have been observed within a year or two and have drawn attention to the desirability of further studies as to its general prevalence at the present time, and the means necessary for its control.

The legislative council of the American Medical Association, which met in Chicago, Ill., December 10, 1907, adopted resolutions to the effect that rabies should be investigated by the United States Public Health and Marine-Hospital Service with the view to its prevention and control.

Provision for investigations of rabies as it affects man had previously been included in a measure which was introduced in the Sixtieth Congress, and which it was expected would become a law. In view of the adoption of the above-mentioned resolution, however, it was decided to immediately resume laboratory investigations, and institute preventive treatment for the protection of persons bitten by rabid animals.

The Surgeon-General, with the approval of the Secretary of the Treasury, accordingly instructed the director of the hygienic laboratory to undertake the preparation of rabies virus in connection with other investigations, and treat any persons who had been bitten by rabid animals and who might apply for such treatment.

The large demand for virus from different parts of the country indicated a widespread distribution of rabies throughout the United States. It therefore seemed desirable to determine as far as possible the geographical distribution of the disease as indicated by deaths among human beings and prevalence among animals.

SOME PREVIOUS REFERENCES TO THE PREVALENCE OF RABIES.

In 1900 Salmon reported an extensive investigation into the prevalence of the disease.[b] He reported 230 deaths among human beings in 73 of the principal cities of the United States during the decade 1890 to 1899. He also detailed reports of the existence of the disease among man or animals in 25 States as follows: Massachusetts, New York, Pennsylvania, Illinois, Iowa, Indiana, Missouri(?), Wisconsin, Montana, Colorado, Nebraska, Minnesota, Ohio, Alabama,

[a] Peters, A., "Rabies in Massachusetts," Am. Jour. of Public Hygiene, Feb., 1907, p. 94.

[b] Salmon, D. E., D. V. M., Yearbook Dept. Agric., 1900.

Tennessee, Maine, Maryland, North Carolina, Louisiana, Delaware, South Dakota, Kansas, Oklahoma, West Virginia, Wyoming.

From the data presented he concluded that rabies was much more common than had been supposed.

In 1906 Schroeder[a] in discussing the prevalence of rabies, presumably in animals, quoted the Chicago Chronicle of September 22, 1906, to the effect that rabies had existed during that year in the following 14 States: Massachusetts, Ohio, North Dakota, South Dakota, New York, Michigan, Connecticut, Indiana, New Jersey, Kentucky, Pennsylvania, Delaware, Illinois, and Rhode Island. In addition, Schroeder knew of cases in Maryland, Virginia, North Carolina, and the District of Columbia.

In 1908 Hart[b] reported especially the prevalence of the disease in the District of Columbia, and stated that since 1903 positive cases had been diagnosed at the pathological division of the Bureau of Animal Industry from the following States: Virginia, Maryland, Indian Territory, Indiana, North Carolina, South Carolina, Georgia, West Virginia, New Jersey, Maine, and Wisconsin. He also referred to reports of its prevalence in Pennsylvania, Connecticut, Florida, Mississippi, New York, Illinois, and Minnesota, and stated that there was abundant evidence to warrant the statement that not a single State was free from the disease.

Interesting facts as to the prevalence of rabies are contained in the appendix to a report issued in 1900 by the committee on public health of the Medical Society of the District of Columbia.[c] Among the localities mentioned is California.

Many similar references might be made to reports of cases and estimates of its prevalence scattered through the literature. The assembling of such isolated references would be of much interest, but it is doubtful if they would render clearer our knowledge of the general prevalence of the disease.

In 1901 Ravenel[d] stated that there was no systematic report of rabies in the lower animals in any State, so that it was impossible to give any idea of the number of dogs or other animals affected yearly. He expressed the belief, however, that the disease was more prevalent than was generally supposed, and that it would increase unless controlled by means of efficient laws.

Moore has also stated that the prevalence of the disease can not be accurately determined, as there are no reliable statistics concerning it.[e]

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[a] Schroeder, E. C., D. V. M., Circ. 120, B. A. I., 1908.

[b] Hart, G. H., D. V. M., Circ. 129, B. A. I., 1908.

[c] Bull. 25 B. A. I., 1900.

[d] Ravenel, Mazyck P., Bull. 79, Dept. of Agric. Penna., 1901.

[e] Moore, Veranus A., B. S. M. D., "The Pathology of Infectious Diseases of Animals," p. 406.

The same statement in a measure applies also with respect to the prevalence of the disease among human beings.

MORTALITY STATISTICS OF RABIES.

On account of the almost uniform fatality of rabies among human beings complete mortality statistics, if available, would give a fairly accurate idea of the geographical distribution of the disease. Unfortunately such statistics for the entire country are not available.

The Bureau of the Census has collected statistics of rabies in the registration area, the deaths by years from 1900 to 1907 being given as follows:[a] 1900, 33; 1901, 41; 1902, 45; 1903, 43; 1904, 38; 1905, 44; 1906, 85; 1907, 75.

The registration area comprised 15 States, the District of Columbia, and 78 cities, and contained an estimated (1906) population of 40,996,317. The total estimated population of the country during that year was 83,941,510.

The census statistics indicate that in 1906 and 1907 there were almost twice as many deaths from rabies as had occurred in any previous year since 1900. These deaths were distributed as follows:

In registration area.	1906.		1907.	
	Cities.	Rural.	Cities.	Rural.
Connecticut	5	1	2	1
District of Columbia	0	0	1	0
Indiana	1	4	1	2
Maryland	2	0	0	0
Massachusetts	5	3	3	0
Michigan	2	2	1	2
New Hampshire	0	0	1	0
New Jersey	5	4	1	3
New York	15	1	27	3
Pennsylvania	10	4	2	10
Rhode Island	2	0	0	0
Cities in other States	19	.....	15	.....
Total	66	19	54	21

PRESENT INQUIRY INTO THE PREVALENCE OF RABIES.

When prophylactic treatment of rabies was begun by the service in April, 1908, preparations were also made to secure information regarding the occurrence of the disease throughout the country.

It was not expected that the facts elicited would by any means represent the exact prevalence of the disease, but rather its geographical distribution. This latter information is of importance from a public-health standpoint as indicating where preventive measures are most needed and where prophylactic treatment should be made available.

[a] Mortality Statistics Bureau of the Census 1904, 1906–7.

For information regarding the disease recourse has been had to state and territorial health authorities, including the District of Columbia, county and municipal authorities, the Bureau of the Census, Pasteur institutes, and press reports. Valuable assistance has been received through these agencies.

On account of the large number who furnished data it is impossible to make personal mention, but acknowledgments are due and here made to all who contributed information and whose cooperation rendered possible the collection of the facts presented.

By making as careful inquiry as possible covering a certain limited period, it was thought that more definite information would be secured regarding the incidence of the disease. The facts collected and presented, therefore, relate only to the calendar year 1908.

Every effort has been made to include only authentic cases among human beings, and it is safe to say that no duplication of cases has occurred.

The same care has also been observed with respect to outbreaks among animals.

The following table contains the number of deaths reported among human beings in each State and the number of localities in each State from which rabid animals were reported:

Rabies in the United States during 1908.

State.	Number of deaths in man.	Number of localities in which rabid animals were reported.
Alabama	1	13
Arizona	1	1
Arkansas	1	5
California	0	0
Colorado	0	1
Connecticut	1	7
Delaware	0	5
District of Columbia	0	1
Florida	0	11
Georgia	3	17
Idaho	0	0
Illinois	2	18
Indiana	5	57
Iowa	1	5
Kansas	2	4
Kentucky	1	7
Louisiana	4	3
Maine	0	0
Maryland	6	12
Massachusetts	5	9
Michigan	3	11
Minnesota	2	18
Mississippi	1	10
Missouri	8	9
Montana	0	0
Nebraska	1	5
Nevada	0	0
New Hampshire	2	7
New Jersey	11	41
New York	19	52
New Mexico	0	0
North Carolina	0	19
North Dakota	0	2
Ohio	4	32
Oklahoma	3	6
Oregon	0	0

Rabies in the United States during 1908—Continued.

State.	Number of deaths in man.	Number of localities in which rabid animals were reported.
Pennsylvania	14	25
Rhode Island	1	10
South Carolina	1	5
South Dakota	0	2
Tennessee	1	7
Texas	3	15
Utah	0	0
Vermont	0	1
Virginia	1	37
Washington	0	0
West Virginia	0	2
Wisconsin	3	42
Wyoming	0	0
Total	111	534

The accompanying map shows the reported deaths from rabies among human beings and outbreaks of the disease among animals.

There are 111 crosses, representing deaths, scattered over 30 States and Territories. These crosses are placed as accurately as possible to show the exact location within the State where the infection occurred. This placing of the crosses was thought preferable, for the purpose of this investigation, to one in which the place of death would be indicated.

The dots represent 534 localities where rabies in animals was reported to have existed during 1908. They are not placed to represent the exact location of the disease, but indicate rather the number of places in each State where rabies existed. This arrangement was adopted in order to illustrate more strikingly the national prevalence of the disease. It is necessary to state in this connection that the apparent preponderance of rabies in certain States must be attributed in part to the receipt of more complete and detailed information from those sections.

In some States where comparatively meager data are indicated a large number of rabid animals were reported, but the localities, not being mentioned, were necessarily omitted in order to avoid possible duplication.

The data presented represent foci of infection actually determined and not the number of cases among animals. The number of foci, however, would no doubt be greatly increased if complete reports from the various agricultural and veterinary institutions were at hand.

Practically all of the figures given, however, are compiled from official sources, representing more than 3,285 replies to inquiries sent out. Press clippings, on the other hand, furnished only a small proportion of the figures, and in no instance did a press report lack official confirmation. This is contrary to the general opinion that the cases reported in newspapers are usually without foundation.

RABIES IN THE UNITED STATES DURING 1908.

+ Deaths among human beings; position of shows where infection was received. ● Foci of infection among animals.

The most striking feature brought out is the very general distribution of the disease throughout the eastern portion of the country and its almost complete absence from the extreme western part, especially the Rocky Mountain and Pacific coast regions. It must be remembered, however, that these sections apparently free from rabies during 1908 have not always been exempt, cases having been reported by previous investigators from Montana, Colorado, California, and Wyoming. The animals reported as having been affected were dogs, cats, wolves, horses, cattle, sheep, hogs, squirrels, and skunks.

It was among skunks that the disease was reported in Arizona, and the single death among human beings in that State followed the bite of one of these animals.

Dr. William Brumby, health officer of Texas, in a discussion of this subject at the conference of state and territorial health officers with the United States Public Health and Marine-Hospital Service, referred to the frequency of the disease among skunks in western Texas and the dangers of the transmission of the disease through the agency of these animals.

Reports received from various sources indicate that a large number of laboratory diagnoses were made of the disease among animals during the year, but it was impossible to include many of these cases in determining the foci of infection, for reasons previously mentioned. Information has been received from a number of institutions, however, where this work is being carried on, and to give some idea of what is being done along these lines a partial list of the institutions is inserted, together with the positive findings in animals during 1908:

Positive findings in animals, 1908.

Delaware State Board of Health Laboratory	7
Connecticut State Board of Health Laboratory	14
Florida State Board of Health Laboratory	20
Bloomington, Ind., University	12
Indiana State Board of Health Laboratory	75
Baltimore, Md., Pasteur Institute	74
Massachusetts Cattle Bureau	135
University of Michigan, Pasteur Institute	101
New Hampshire State Board of Health	7
New Jersey State Board of Health	13
New York Pasteur Institute	60
North Carolina State Laboratory of Hygiene	21
Vermont State Board of Health	2
Wisconsin State Hygienic Laboratory	47
New York State Veterinary College	188
Minnesota State Live Stock Board	15
Bureau of Animal Industry, Washington	121
Cleveland Health Department, East Side	49
Pennsylvania State Live Stock Sanitary Board	103
Ohio State Board of Health Laboratories	32
Virginia Pasteur Institute, Richmond	39
Biological Laboratories, Brown University, Providence, R. I	32

These figures represent, however, in many instances, only a small proportion of the actual number of cases occurring in the various States. As a single instance may be mentioned the case of Wisconsin, where, although but 40 cases were actually demonstrated in animals, from the result of circular inquiries made by the state veterinarian it was estimated that 584 animals had died from the disease during the past year. These were distributed as follows: Hogs, 100; cattle, 400; sheep, 28; and horses, 56. No accurate estimate of deaths among dogs could be made.

ANALYSIS OF REPORTED FATAL CASES IN MAN.

While complete data were not given in every case reported, there is perhaps sufficient material at hand to warrant an analysis of the fatal cases which may be of some value.

Distribution as to age of 79 persons dying of hydrophobia during 1908 in the United States, by ten yearly divisions.

Age.	
1 to 10 years	31
11 to 20 years	12
21 to 30 years	9
31 to 40 years	6
41 to 50 years	10
51 to 60 years	7
61 to 70 years	2
71 to 80 years	2
Total	79

Average age at death, 24.92 years

Period of incubation in 71 fatal cases during 1908.

The incubation period was recorded with considerable accuracy in 71 of the human cases of rabies reported as having died during 1908. These cases are separated into groups with respect to the length of incubation, as follows:

	Persons.
Under ten days	None.
Ten to twenty days	10
Twenty-one to thirty days	14
Thirty-one to forty days	7
Forty-one to sixty days	19
Over two months, less than four months	14
Four months to six months	3
Six months to twelve months	2
Over one year	2
Total	71

The shortest period of incubation reported was ten days; the longest was three hundred and eighty-two days, with the exception of one case in which the exposure was stated to have occurred four

CHART I.

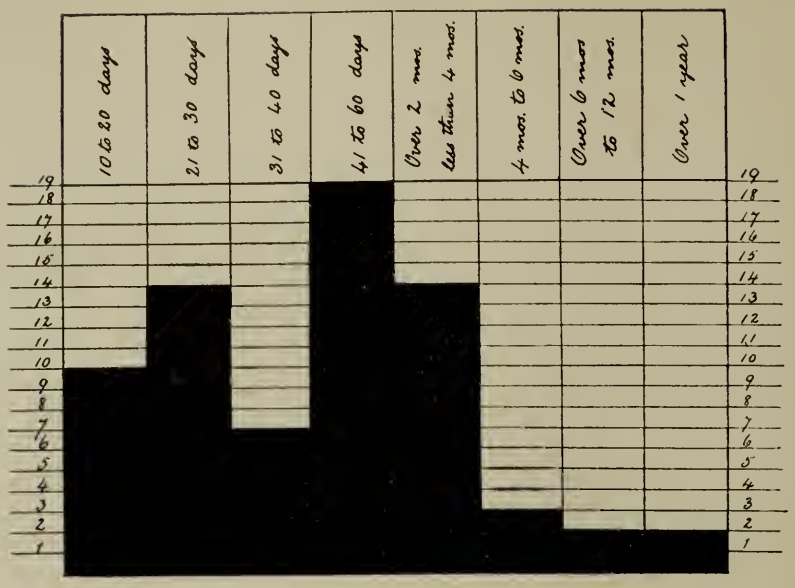


CHART II.

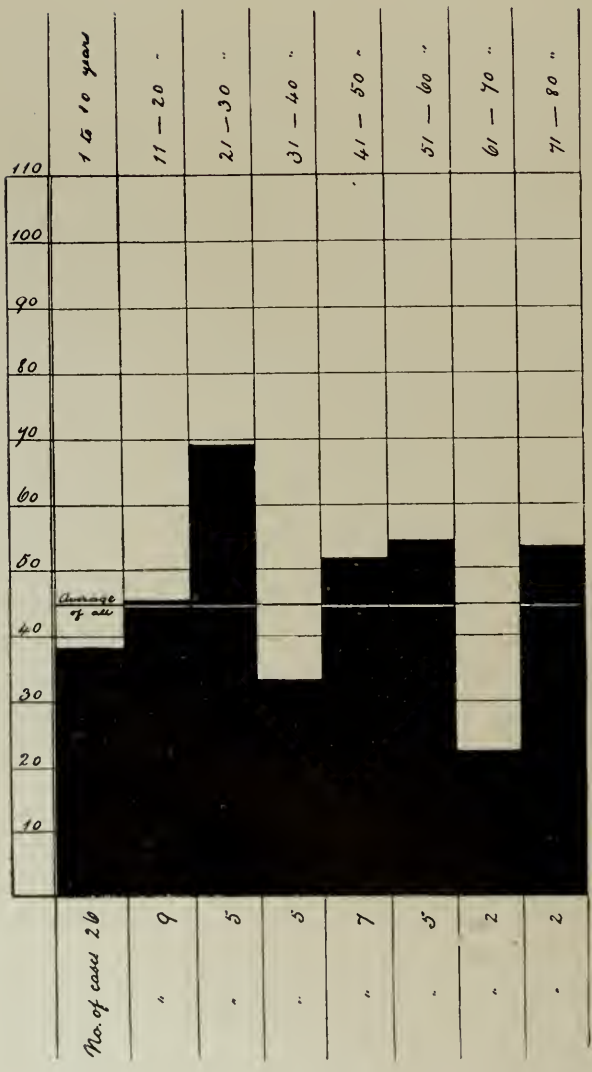
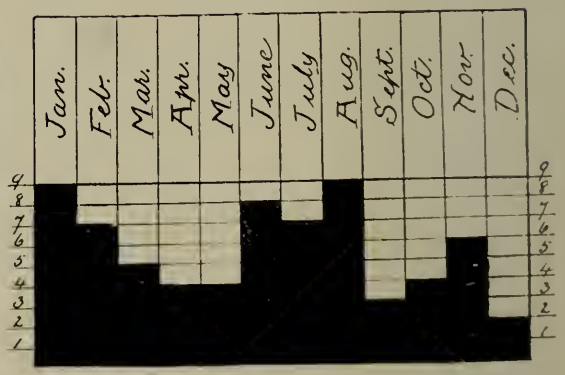


CHART III.



years before the onset of the disease. This case has been excluded in computing averages. The average period of incubation as shown by these figures was 62.41 days.

The accompanying Chart I is arranged to graphically represent the period of incubation of the 71 cases mentioned; the black areas in the vertical columns representing the number of cases for each period.

Incubation period as influenced by the age of the patient.

The relation between the age of the patient and the period of incubation is shown in the following table:

Age period.	Number of cases.	Incubation.		
		Days.	Excluding figures unusually high for class.	
			Number of cases.	Days.
1 to 10 years	27	40.63	26	37.84
11 to 20 years	11	69.63	9	40.66
21 to 30 years	8	99.37	5	69.00
31 to 40 years	5	33.8	5	33.8
41 to 50 years	9	109.66	7	52.14
51 to 60 years	6	70.33	5	54.4
61 to 70 years	2	22.5	2	22.5
71 to 80 years	2	53.5	2	53.5
Total	70	.....	61	.....
Average	.....	62.41	.....	45.48

When dealing with so few cases the presence of an unusual period of incubation in any one group so modifies the average as to destroy the relations of the groups. For this reason the above comparative table with these unusual figures eliminated is given, the result being to lessen the differences among the various age groups.

The period of incubation as influenced by the age of the patient is also presented graphically in Chart II, the excessive figures being eliminated. The second vertical black column should be 40.66 instead of 46.

The time of year at which infection was received in the fatal cases.

These data are recorded in 68 instances and arranged in the following table and Chart III.

Time of year in which infection was received in the cases of 68 persons who died of hydrophobia during 1908 in the United States: January, 9; February, 7; March, 5; April, 4; May, 4; June, 8; July, 7; August, 9; September, 3; October, 4; November, 6; December, 2.

Analysis of cases which had some Pasteur treatment.

Number of cases	23
Apparently complete treatment, and died fourteen or more days later	12
Incomplete treatment	6
Died within twelve days of last injection	5
	23
Cases untreated	51
Total cases giving data as to treatment	74

SUMMARY OF ANALYSIS OF HUMAN CASES.

The average age of the persons who died was about 25 years. The number of persons of this age period, 21 to 30 years, was, however, only about one-ninth of the entire number of cases. Over one-half of the cases were under 21 years of age. The average period of incubation was about two months. Ninety per cent of the cases had an incubation period of less than four months. The shortest period was ten days, a well-authenticated case. One case reported by a good authority had the incubation period given as four years. In such cases the probability of an unnoticed or forgotten exposure must be suspected. This case was excluded in computing averages. The number of cases is too small to throw much light on the influence of age on incubation period, because the occurrence of one or two unusual periods in any one group produces an unnatural distortion of the curve.

In addition to this factor must be considered the location of the bite. Bites on the face and exposed parts, more likely to occur in children, are known to be more frequently followed by comparatively early death. No conclusions as to the comparative resistance to the disease offered by persons of various ages are considered justifiable. Comparatively more persons were infected in the months of January, February, June, July, August, and November than during the rest of the year.

Of 74 cases in which data were given, 12 had received the Pasteur treatment and lived long enough afterwards for the development of immunity, according to the standards laid down by Pasteur and now accepted by a majority of Pasteur institutes. The rather large proportion of persons so treated to the total number of records (12:74) does not disparage the Pasteur treatment any more than in the case of diphtheria; a large proportion of persons treated by antidiphtheria serum among those dead of the disease would vitiate the valuation of antitoxin.

Our data are not complete enough to be the basis of any conclusion on that most important subject, the comparative mortality of

treated and untreated exposed persons. Such data it will be impossible to obtain until our system of collecting and recording statistics shall have been enormously improved. In the meantime we shall have to rely on the figures given by European observers and the data of small and isolated observations in this country.

FACILITIES FOR TREATMENT OF RABIES IN THE UNITED STATES.

The reports thus far secured indicate that nearly 1,500 persons took the Pasteur treatment during 1908 on account of having been bitten by rabid or supposedly rabid animals. On account of the futility of legal measures for the suppression of the disease, resort to prophylactic treatment to this extent was rendered necessary.

Pasteur treatment was no doubt a potent factor in the prevention of human deaths from this disease, but it must be regarded as a temporary and costly expedient to be maintained to save lives only until such time as more effective measures of attacking the disease at its root have been perfected and put in operation.

Upon inquiry, it has been ascertained that the Pasteur treatment is being given at present at the following institutions:

PASTEUR INSTITUTES, OR THEIR EQUIVALENTS, IN THE UNITED STATES.

Montgomery, Ala., under State Board of Health.
Newark, Del., under State Board of Health.
Washington, D. C., Hygienic Laboratory, Public Health and Marine-Hospital Service.
Jacksonville, Fla., under State Board of Health.
Atlanta, Ga., two institutions, one of them under the State Board of Health.
Chicago, Ill.
Indianapolis, Ind., two institutions.
Iowa City, Iowa, under State Board of Health.
New Orleans, La.
Baltimore, Md.
Ann Arbor, Mich., under Board of Regents, State University.
Minneapolis, Minn., under State Board of Health.
St. Louis, Mo.
New York, N. Y., two institutions, one of them under the municipal government.
Raleigh, N. C., State Laboratory of Hygiene.
Pittsburg, Pa.
Marietta, Pa.
South Carolina, one to be opened in July, 1909, under State Board of Health.
Austin, Tex., under State Board of Health.
Richmond, Va.

There are thus over 20 institutions located in 19 States prepared to give Pasteur treatment, 12 of them being under official auspices.

VIRUS FURNISHED BY THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

Since April 1908, the United States Public Health and Marine-Hospital Service has been treating, free of charge, exposed persons who applied at the Hygienic Laboratory, Washington, D. C. At the close of the calendar year, 99 persons had availed themselves of the privilege. In addition, virus has been furnished to state health authorities upon their request, and for administration under their direction.

The treatment of persons at a distance from the laboratory by means of virus, forwarded when necessary under the system maintained, has proved entirely satisfactory. By this means, a supply of virus is made available at all times, and especially to persons unable to secure it themselves because of financial limitations.

The treatments are shipped by mail in response to telegraphic request, and upon arrival are both pure and potent. Slight delay in delivery has seemed to cause no appreciable decrease in potency, a considerable number of treatments having been sent to the Isthmian Canal Zone, and used there with complete success.

The Pasteur treatment is undoubtedly a powerful factor in preventing mortality, but the necessity for it will be obviated when measures for the suppression of the disease among animals become effective.

That the extinction of rabies is a possibility is a matter of historical knowledge, as evidenced by the brilliant results of effective legislation in England and other countries.

The prevalence of rabies to the extent shown by this inquiry is evidence that further measures of suppression are necessary. It is pertinent in this connection to refer briefly to the measures authorized in certain States concerning which information is at hand.

In Connecticut a state law requires the registration and tagging of dogs and the destruction of dogs not registered and tagged. Local health officers are required to report the occurrence of rabies to the commissioner on domestic animals, who may make regulations to check the spread of the disease, such regulations to be published and obeyed under penalty of fine. A state law also provides for Pasteur treatment when necessary, at state expense. On the oath of a physician that the treatment is necessary it is furnished at the expense of the town, the town being reimbursed from the state dog-license moneys.

In Delaware patients are treated by the state board of health at cost.

In the District of Columbia the District Commissioners are required to issue a muzzling ordinance upon the occurrence of rabies. Exposed persons are treated at the Hygienic Laboratory, Public Health

and Marine-Hospital Service, upon application, and treatments are mailed free upon application by state health authorities.

In Florida the duty is placed by law on the state board of health to prevent the importation and spread of rabies. The Pasteur treatment is administered under the general statutes by the state board of health at the patient's home.

In Indiana the state veterinarian is authorized to order the muzzling of dogs on the appearance of rabies.

In Maine the state law empowers the state board of health to make regulations preventing the introduction and spread of rabies.

In Massachusetts the powers to take measures are delegated to the cattle bureau, except in the city of Boston, where the board of health has this authority. A resolution recently approved in the legislature provides that the state board of health shall cause suitable provision to be made for the treatment of rabies in man by appropriate remedies, and shall report as to the expense and advisability of preparing these remedies under the direction of the state board of health.

In Michigan the prevention of rabies is provided for in the law relating to diseases in cattle, and indigent persons are treated at the expense of the township, city, or village.

In Minnesota by a regulation of the sanitary live-stock board, a muzzling order may be issued by local boards of health where rabies exists. A state law provides for the free treatment of residents of the State, a special appropriation having been made for the purpose.

In New Hampshire a law permits the local authorities to cause all dogs to be muzzled for such period as may be determined.

In New Jersey laws provide for the issuance of a muzzling ordinance by the mayors of incorporated towns, and the destruction of unmuzzled dogs; also for the notification of the state board of health of contagious or infectious diseases among animals, the investigation of reports by the board, and the taking of such precautionary measures as may be deemed necessary.

In New York the restriction of the disease is placed under the control of the state commissioner of agriculture. A law provides that patients may be sent to New York for treatment at county expense.

In Rhode Island there is no state law controlling rabies. When the disease exists the local councils require the muzzling of dogs for a certain period.

In South Carolina a law provides that the health officers shall, in case rabies exists, place restrictions to prevent its spread.

In Vermont the public statutes empower the state board of health to make regulations to muzzle dogs when rabies is found, and to kill unmuzzled animals.

These serve to illustrate briefly the measures in use. A considerable number of States appear to have no provision for the institution

of measures against rabies, while from others no data have as yet been received.

Notwithstanding the beneficient intent of these state laws and the good results to be expected of them, it is a matter of common observation that their enforcement is too often, through neglect or inability to overcome the obstacles which always appear, more of a failure than an effectual application of suppressive measures.

SUMMARY.

To summarize briefly the results of this inquiry, there were 111 deaths in human beings from hydrophobia reported from 30 States during the year 1908. Rabies was reported in the lower animals from at least 534 localities in 39 States and Territories, including the District of Columbia. Evidence has also been secured of nearly 1,500 persons who, on account of exposure to rabid or presumably rabid, animals, were obliged to take the Pasteur treatment.

The disease is disseminated throughout the eastern three-fourths of the country, and seems to have been unknown during the past year only in the Rocky Mountain and Pacific slope regions.

The suppression of rabies in man is only another instance of the necessity of eliminating the same disease from among animals.

This means the destruction of infected animals, and the proper muzzling of all dogs in infected areas.

O